COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
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MassDEP
Bureau of Waste Prevention
Division of Consumer and Transportation Programs

310 CMR 60.02: Massachusetts Motor Vehicle Emissions Inspection and Maintenance Program

Background Document and Technical Support for Public Hearings on the Proposed Amendments to the State Implementation Plan for Ozone

Regulatory Authority: Massachusetts General Laws, Chapter 111, Sections 142A through 142M

February 2007

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Background Document and Technical Support For Public Hearing

To Consider Amendments to:

310 CMR 60.02: Massachusetts Motor Vehicle Emissions Inspection and Maintenance Program

February 2007

The Massachusetts Department of Environmental Protection (MassDEP) is proposing amendments to the Massachusetts Motor Vehicle Emissions Inspection and Maintenance Program Regulation, 310 CMR 60.02, and the State Implementation Plan (SIP) for ozone.

I. INTRODUCTION

Massachusetts' air exceeds the federal health based standards for ground level ozone. On "bad air" days, there are increases in asthma attacks and hospitalizations for people with severe respiratory ailments. To reduce the number of "bad air" days and to comply with the Federal Clean Air Act and U.S. Environmental Protection Agency (EPA) regulations, Massachusetts implements a variety of federally mandated programs, which are collectively known as the "State Implementation Plan" or "SIP".[1]

The most recent inventory of sources of ozone causing pollutants (volatile organic compounds and nitrogen oxides) in Massachusetts[2] indicates that motor vehicles operated on roads ("on-road vehicles") contribute approximately 37% of those pollutants. To reduce pollution from motor vehicles, EPA requires Massachusetts to operate an Enhanced Inspection and Maintenance (I&M) program. EPA sets performance standards for I&M programs[3].

[1] These programs are established in legally binding and federally enforceable "State Implementation Plans" or "SIPs".
[2] Massachusetts 2002 Baseline Emission Inventory of Volatile Organic Compounds and Nitrogen Oxides, June 2006. http://www.mass.gov/dep/air/priorities/s1dintro.pdf
[3] 40 CFR Part 51, Subpart S (§51.350 et seq.).

The Massachusetts Department of Environmental Protection ("MassDEP") and the Massachusetts Registry of Motor Vehicles ("RMV") jointly administer the I&M program. The I&M Program is designed to reduce ozone pollution and achieve and maintain clean air, and to ensure that motor vehicles that are operated in the Commonwealth are safe. The current Massachusetts I&M program was authorized by the Legislature by Chapter 210 of the Acts of 1997. Implementing regulations (310 CMR 60.02) were initially adopted in January 1999**.** Since 1999, the program has been implemented through a contract with Applus Technologies, Inc.[4]

The I&M program, as established in 1999, has four goals:

- To reduce vehicle pollution;
- To identify unsafe vehicles;
- To ensure that the program is convenient and reasonably priced for the public; and
- To promote effective repairs by designing the program to fit well with the repair industry.

There are approximately 4.6 million vehicles registered in Massachusetts. Under the current regulations, all are required to obtain an annual safety inspection, and the vast majority of vehicles receive an emissions test every other year. Vehicles currently exempt from emissions testing are:

- Model year 1984 or older;
- Less than 2 years old and still registered to the original owner; or
- Light and medium duty diesel fueled vehicles.

Since 1999, the program has relied on a decentralized network of inspection stations that are licensed by RMV to conduct safety and emissions tests. Most Massachusetts vehicles receive their inspections at local public stations. The program also allows owners of vehicle fleets to purchase testing equipment so they can test their own vehicles. In 2006, 1,674 stations conducted inspections: 1,565 were public stations and 109 were fleet only stations.

The current contract will expire on September 30, 2008, and the Agencies are now reviewing bids solicited through a competitive process for a new contract. MassDEP is proposing to amend its I&M regulations to update the program and to comply with federal requirements that have been enacted since the regulations were last amended. At the same time, RMV is proposing to amend its regulations (540 CMR 4.00-4.09). The Agencies will seek public comment jointly. Also, prior to October 1, 2008, the Executive Office of Administration and Finance may propose regulations that would revise the fee that motorists pay for inspections, following the promulgation of MassDEP and RMV revised regulations and the execution of a new contract. Vehicle testing under the new contract will begin on October 1, 2008.

Under the proposed regulations, the I&M program will continue to deliver inspections through a decentralized network of local inspection stations. All vehicles will continue to receive an annual safety inspection. However, the amendments propose to require an annual emissions test,

[4] The Contractor was originally known as "Keating Technologies, Inc." In July 2001, the Contractor changed its name to "Agbar Technologies, Inc."(due to a corporate buy-out), and in February 2005, changed its name again to "Applus Technologies, Inc".

rather than the biennial test in the current program. The emissions test would rely primarily on an "on-board diagnostic" (OBD) test; the current program's use of a dynamometer to test tailpipe emissions would be discontinued. Large diesel trucks and buses not equipped with an OBD system would continue to receive an opacity test; the amendments propose to lower the opacity cut points for these vehicles. As new medium- and heavy-duty vehicles become equipped with OBD systems, they would also be required to obtain an annual OBD emissions test.

This document summarizes the proposed amendments to 310 CMR 60.02, and describes key issues on which MassDEP seeks public comment. It also describes the impact of these regulation (and program) changes on air quality and the Commonwealth's economy. The proposed amendments can be found in Appendix A.

As required by M.G.L. c. 111, Section 142K and M.G.L. c. 30A, MassDEP seeks public comment on these proposals. Information about public hearings and how to submit written comment can be found in the Notice of Public Hearing in Appendix B. This public comment period has also been designed to comply with EPA's requirements for revisions of State Implementation Plans.

II. SUMMARY OF PROPOSED AMENDMENTS TO 310 CMR 60.02

The I&M regulation is proposed to be modified as follows. The amendments that are consistent with the new I&M program contract would take effect on October 1, 2008.

<u>OBD Emissions Testing</u>

- Tailpipe testing requirements for most vehicles that are not equipped with OBD would be deleted.

- Most OBD-equipped vehicles in Massachusetts would receive an annual emissions test instead of a biennial test.

- The vehicles described in Table 1 below would be subject to an OBD emissions test.

Table 1
Vehicles That Would Receive an OBD Emissions Test

Vehicle Fuel	Gross Vehicle Weight Rating (GVWR)	OBD Testing Starting with Model Year
Non-diesel	Light duty: 8,500 pounds or less	1996
Diesel	Light duty: 8,500 pounds or less	1997
Non-diesel	Medium duty: greater than 8,500 and less than or equal to 14,000 pounds	2008
Diesel	Medium duty: greater than 8,500 and less than or equal to 14,000 pounds	2007
All	Heavy duty: greater than 14,000 pounds	Phased in as OBD systems are required to be installed, starting with model year 2010

- OBD-equipped vehicles would be exempt when they are 15 years old (a rolling 15-year exemption).

- Vehicles that fail the emissions test because the malfunction indicator light (MIL) on the dashboard is commanded on by the OBD system would be checked to make sure it is functioning.

- When an emissions inspection indicates that a vehicle's emission control system has been tampered with or otherwise altered so that a complete test cannot be performed, the motorist would be required to present his or her vehicle to a location designated by the Agencies to resolve the issue. For example, a mismatch between the Vehicle Identification Number (VIN) and the OBD VIN indicates that the vehicle's emission control system may have been tampered with.

<u>New Vehicles Equipped with OBD</u>

- The two year exemption from emissions inspection currently provided for new vehicles would be eliminated.

- New vehicles would receive an advisory computer scan of their OBD systems as part of the inspection required for the vehicles' first registration. This scan would not be an emissions test, but it would provide an electronic "fingerprint" of the vehicle for future use by the Agencies in detecting tampering with vehicles' emission control systems and preventing fraudulent inspections.

- The scan would verify that the OBD system is operating properly, and would advise the dealer and the buyer if it finds a fundamental flaw (e.g. the on-board computer is not performing the required checks on the vehicle or will not communicate with OBD test equipment, or the vehicle's VIN and OBD VIN do not match). If a fundamental flaw is identified but not fixed before the vehicle has its first emissions test, the vehicle would fail its inspection. New car dealers authorized by RMV to use their pre-delivery inspection as a safety inspection would be allowed to perform this scan before a vehicle is delivered.

Emissions Tests for Medium and Heavy Duty Diesel Trucks and Buses Not Equipped with OBD

- Opacity testing requirements would be retained for heavy-duty diesel vehicles and medium duty diesel vehicles more than 10,000 pounds GVWR that are model year 1984 and newer and that do not have OBD systems.

- The diesel opacity cutpoints for the opacity test would be tightened, as described in Table 2.

Table 2
Proposed Opacity Test Cutpoints
For Diesel Trucks and Buses greater than 10,000 pounds GVWR

	Current Cutpoints Percent Opacity	**Cutpoints Beginning October 1, 2008 Percent Opacity**
Diesel trucks greater than 10,000 pounds GVWR		
1984 – 1990 model years	55%	40%
1991 – 1996 model years	40%	30%
1997 and newer model years	40%	20%
Diesel buses greater than 10,000 pounds GVWR		
1984 – 1987 model years	40%	40%
1988 – 1993 model years	40%	30%
1994 and newer model years	30%	20%

Emissions Tests for Other/Specialty Vehicles

- Glider kits (vehicles weighing more than 10,000 pounds with a different vehicle body placed upon the original chassis) would be required to have a visual inspection when they are first registered, to verify that they were assembled consistently with their configuration certified by EPA or the California Air Resources Board (CARB). Some glider kits may be subject to an opacity test, based on the model year of the chassis.

- Kit vehicles (unique or replica vehicles with production volume less than 500 vehicles per year) would be required to have a visual inspection when they are first registered and

upon change of ownership to verify that they comply with applicable emission control requirements. This is consistent with EPA's policy on kit vehicles[5]. A list of the documentation that must be provided for the kit vehicle visual inspection will be posted on the Enhanced Emissions and Safety Test Program web site.

- Provisions governing engine-switching would be revised to reflect EPA requirements, to ensure that replacement engines are appropriate for the vehicle in which they are installed and maintain the vehicle's low emissions characteristics.

- Definitions and other provisions would be revised to address assembled and reconstructed vehicles, gray market vehicles, specialty import vehicles, and vehicles that have been issued exemptions by EPA or CARB.

Waivers from Emission Standards

- The expenditure thresholds for waiver eligibility would be increased, based on increases in the Consumer Price Index since the thresholds were originally established (on the basis of 1989 dollars). Cost thresholds for waivers would still be based on the age of the vehicle, and would be used to consider a vehicle for a waiver when repair costs exceed:
    - $750 for vehicles five model years old or newer;
    - $650 for vehicles six to ten model years old; and
    - $550 for vehicles more than ten model years old.

- The new waiver expenditure thresholds would be adjusted annually, based on the changes in the Consumer Price Index, starting in 2010.

- Eligibility criteria would be updated to reflect factors that the program has been using informally to determine waiver eligibility for OBD equipped vehicles since full-scale OBD testing started in 2004. Waivers would only be available for vehicles that:
    - Failed their initial inspection, were repaired, and failed their re-inspection;
    - Have not failed their reinspection for problems that would cause the vehicle to be a gross emitter (catalytic converter efficiency, misfire, diesel particulate filter or energy storage in hybrid vehicles);
    - Are registered as a private passenger motor vehicle or auto home (no waivers for commercial vehicles);
    - Meet all safety requirements;
    - Show no evidence that the emissions control system has been tampered with;
    - Have a properly functioning malfunction indicator light;
    - Have had repairs performed by a registered repair technician that are appropriate to the diagnostic trouble codes that caused the failure;
    - Have used all relevant manufacturer related warranties and recalls; and
    - Have repair costs that exceeded the thresholds described above.

- Costs associated with the following repairs would be ineligible for consideration towards the waiver cost limit:

[5] EPA Kit Car Policy, June 8, 1994. http://www.epa.gov/otaq/imports/kitcar.htm

- Correcting an improper engine switch or replacement;
- Correcting tampering;
- Returning the malfunction indicator light to proper operation;
- Meeting the minimum test criteria for readiness (to ensure that the OBD computer is running its required checks of vehicle systems); however, for repairs requiring replacement of the power train control module (i.e., the on-board computer), a motorist will be allowed to combine one half of the replacement cost of the module with the cost of repairs needed to resolve diagnostic trouble codes to meet the applicable waiver expenditure limit; and
- Any repairs not performed by a registered repair technician, except where MassDEP has specified that certain specialty repairs may be performed by a non-registered repairer.

- The diagnostic waiver provision would be deleted, since this only applies to tailpipe tests. This deletion would take effect on October 1, 2008, when the tailpipe test would be discontinued.

<u>Economic Hardship Failure Repair Extension</u>

- An Economic Hardship Repair Extension would allow a one year extension of the requirement to pass an emissions test, for non-commercial OBD vehicles that:
  - Have failed their re-inspection;
  - Have no safety failures;
  - Have an emissions control system that shows no evidence of tampering;
  - Have an estimate of emissions-related repair work from a registered repair technician that MassDEP agrees is reasonable and is more than 1.5 times the applicable waiver repair expenditure threshold;
  - Have exhausted all warranty coverage including recalls; and
  - Do not qualify for a waiver.

- The extension would be valid until the vehicle's next emissions inspection, and would not be eligible for renewal. A vehicle receiving an economic hardship repair extension would be required to pass its next emissions test.

- No economic hardship extensions would be given for inspections associated with a change of ownership.

<u>Registered Repairers</u>

- The registered repairer technician eligibility would be expanded to include certifications for certain types of vehicles, such as:
  - Specific fuels (e.g., diesel); or
  - Specific engines, vehicle makes or models at a manufacturer's repair facility or dealership at which the registered repairer is employed.

- MassDEP would be authorized to remove repairers from the list of registered repair technicians if the repairer:
  - Does not maintain the requirements for qualification;

- Provides false documentation of a repair or repair costs to the Agencies; or
- Has been determined to have been a party to deceptive or fraudulent business practices related to emissions control system repairs or to environmental protection.

- In addition to its current practice of removing repair shops that no longer employ a registered repair technician from the program's list of registered repair facilities, MassDEP would also be authorized to remove repair shops from the list of registered repair facilities if the repair shop:
  - Provides false documentation of a repair or repair costs to the Agencies; or
  - Has been determined to have been a party to deceptive or fraudulent business practices related to the repair of emission control systems or environmental protection.

General

- I&M requirements that are currently in effect would remain so through September 30, 2008.

- New requirements proposed in this package (which are consistent with the new I&M program contract) would take effect on October 1, 2008.

- Minor edits would align the regulations with current program practices, such as:
  - Allowing vehicles that have been granted an emission control system waiver or exemption by the certifying agency (EPA or CARB) to also be exempt from the Massachusetts emissions inspection to the extent of the waiver or exemption;
  - Changing the requirement for an emissions inspection from within seven days of the date of vehicle purchase to within seven days of the date on which the motor vehicle is registered in the state to the new owner, as is currently required by the RMV;
  - Specifying which waiver provisions apply specifically to transient loaded or two-speed idle tests, and to OBD tests; and
  - Clarifying the definition of "tampering" to note that the term includes using a fuel that a vehicle is not certified to use or otherwise approved by EPA or CARB.

Proposed revisions to 310 CMR 60.02 can be found in Appendix A.

III. KEY ISSUES

The federal Clean Air Act as amended in 1990 (CAA) required EPA to establish rules for states to follow in designing and implementing vehicle inspection and maintenance programs. Section 182(c)(3) of the CAA amendments addresses vehicle inspection and maintenance programs. On November 5, 1992, EPA issued final rules implementing Section 182 of the CAA amendments of 1990[6]. The MA program has been designed to comply with EPA requirements except in circumstances where the program goes beyond federal requirements (e.g., opacity testing).

[2] 40 CFR Part 51

Emissions Testing Technology: From Idle to Dynamometer to OBD Test

Beginning in Spring 1983, Massachusetts implemented an I&M program based on a vehicle emissions idle test that measured carbon monoxide (CO) and hydrocarbon (HC) emissions at the tailpipe while the vehicle was idling. In implementing the 1990 CAA, EPA required that MassDEP, as part of its comprehensive plan to improve the state's air quality, replace its vehicle emissions idle test with an enhanced emissions inspection and maintenance program. The enhanced program was based on a dynamometer test, which simulated driving conditions while measuring CO and HC at the tailpipe, and included NOx testing for the first time in Massachusetts. In 1999, MassDEP revised the Massachusetts I&M regulations to reflect the enhanced I&M program, and, with RMV, selected a network contractor through a competitive bidding process to manage the inspection program.

In April 2001, EPA updated the I&M testing requirements to require testing using vehicles' own OBD systems that started to be built into light duty vehicles beginning with model year 1996. MassDEP amended the Massachusetts I&M regulations in 2003 to include EPA's requirement to use OBD systems to test emissions.

EPA's requirement for the use of OBD systems applied to light-duty vehicles fueled with gasoline and other non-diesel fuels ("non-diesel vehicles") and sold in the U.S. Beginning with model year 1996, OBD systems were required to meet specifications known as "OBD II"[7]. OBD II is a standardized protocol in which a vehicle monitors its own emissions control systems with an on-board computer and communicates information from the computer to external test equipment in an inspection. The OBD protocol monitors the vehicle's emissions control systems under actual driving conditions, rather than the conditions simulated by a dynamometer used to test tailpipe emissions. OBD checks provide a more complete assessment of the emission control system's performance: for example, the OBD evaporative control check tests the complete vapor control system, not just the gas cap which is checked on vehicles that are not equipped with OBD.

The amendments to the I&M regulations proposed here reflect the changing Massachusetts vehicle fleet and improved testing technologies. In 2006, 76% of the vehicles registered in Massachusetts were equipped with OBD. By 2009, MassDEP projects that this percent will increase to 88%, and by 2012 to 94%. While EPA has required light duty non-diesel vehicles to be equipped with OBD since model year 1996, the agency has also required OBD to be installed in medium-duty diesel vehicles starting with model year 2007, and medium-duty non-diesel vehicles starting with model year 2008. New heavy-duty vehicles are scheduled to begin phasing in OBD compliance beginning with model year 2010, and to complete phase-in by model year 2013.

To comply with EPA's requirement to use the OBD approach to the maximum extent possible, these revisions of the I&M regulation propose to discontinue dynamometer tailpipe testing and to rely on OBD emissions testing, starting with the commencement of the new program contract on October 1, 2008. As the Massachusetts vehicle fleet becomes increasingly equipped with OBD,

[7] "OBD" in this document refers to OBDII.

there is a decreasing need for dynamometer tailpipe testing. As the dynamometer equipment that was installed in inspection stations in 1999 continues to age, it is increasingly expensive and labor intensive to operate, maintain, repair, calibrate, and audit. As the fleet continues to turn over, there will be fewer and fewer pre-1996 vehicles in Massachusetts and this equipment would be used less and less often. Where the tailpipe test on the dynamometer takes approximately fifteen minutes to perform, the OBD emissions test takes only one or two minutes, providing shorter wait times for motorists. In addition, the OBD emissions test makes it easier for the Agencies to detect and enforce against inspector fraud and vehicles that have been tampered with by motorists.

RMV requires that safety inspections of all vehicles include a check for visible smoke; vehicles emitting visible smoke are required to be repaired and re-tested (540 CMR 4.00-4.09). RMV is proposing to continue to subject non-OBD compliant light- and medium-duty vehicles (e.g., pre-model year 1996 vehicles) to this prohibition, which will help ensure that older vehicles emitting enough smoke to be seen by an inspector are repaired.

The amendments proposed by MassDEP include a new requirement that non-OBD compliant kit vehicles (unique or replica vehicles manufactured in lots of less than 500) will also receive a separate comprehensive visual test when new and upon change of ownership, to ensure that all required emissions control components are installed. Heavy-duty diesel vehicles and medium-duty diesel vehicles more than 10,000 pounds GVWR[8] and not otherwise subject to an OBD test will continue to receive an opacity test.

The revisions of the I&M regulation would add a requirement that a computer scan of a new vehicle's OBD system be performed to establish an "electronic fingerprint" of the vehicle's OBD system when the vehicle is new. This scan would not be an emissions test, but would provide data that the Agencies could use in the future to determine whether future inspections are being conducted properly. It would also provide the vehicle purchaser and the dealer with early notice of problems that would need to be resolved before the vehicle receives its first emissions inspection. The vehicle owner and dealer/manufacturer would then have a year to address any potential problems, if necessary, rather than the 60 day period that is normally be afforded for repairs following an emissions test failure.

The amendments would eliminate the current two-year exemption from emissions testing for new vehicles that remain registered to their original owners. Earlier emissions testing would identify malfunctions covered by emissions warranties when the warranties are still in effect, enhancing consumer protection.

Malfunction Indicator Light Bulb Check

Current Massachusetts OBD test procedures do not check the operation of the malfunction indicator light (MIL) bulb. The amendments would require that the MIL bulb be checked in vehicles that fail their OBD test when the MIL is commanded on:

[8] All vehicle weights in this document refer to Gross Vehicle Weight Rating or "GVWR". Vehicle classes are defined in Table 1 above.

- In an initial inspection, the inspector would be prompted to check to see whether the MIL bulb is illuminated when the workstation detects that the MIL has been commanded on. This bulb check would be performed with the vehicle in a "key on/engine running" (KOER) mode. If the bulb is not illuminated, the vehicle would fail its inspection. Failure of the MIL to illuminate when commanded on would be listed as a cause of the emissions test failure on the Vehicle Information Report (VIR) provided to the motorist.

- When a vehicle fails this bulb check, its re-inspection would include a "key on/engine off" (KOEO) bulb check to verify that the bulb has been repaired. If vehicle repairs were unsuccessful and the MIL is still commanded on, the inspector would also be prompted to check MIL function in the KOER mode. A waiver would not be issued to a vehicle that has this malfunction, and costs for this repair would not count toward waiver cost repair limits.

A KOEO bulb check is proposed only for vehicles that failed the KOER bulb check during their initial inspection. When MassDEP developed the current OBD test procedures, consideration was given to the probability that vehicles would fail the KOEO bulb check, the likelihood of false failures for the KOEO bulb check, and the motorist inconvenience caused by false failures.

Information from Oregon's centralized OBD emissions test program (obtained by MassDEP in 2002) showed a KOEO bulb check failure rate of 0.2%. Even with this low failure rate, Oregon opined that this aspect of the test was highly prone to false failures because the MIL stayed illuminated in some vehicles for only a very brief period, so that the illuminated bulb was not always seen by inspectors. About half of the vehicles failing the KOEO bulb check also failed their emissions test because the electronic scan of the OBD system found the MIL was commanded on.

Based on Oregon's experience, prior to beginning full scale OBD testing in 2004, Massachusetts conducted a brief OBD pilot program that included the KOEO bulb check. Of the vehicles that failed their OBD test in this pilot program, 4.2% failed the KOEO bulb check. This raised concern that inspectors were likely to falsely fail a substantial number of vehicles. The New England Service Station and Auto Repair Association commented that the bulb check was unnecessary because the MIL command status was being checked by the electronic scan of the OBD system, and that some vehicles were likely to have a high false failure rate because their MIL does not stay on very long when the key is first turned on, so that the inspector could easily miss the bulb's illumination.

More recent information from other states indicates that KOEO bulb check failure rates remain very low. In I&M programs designed with centralized testing, the failure rates range from 0.4-0.7%, and in decentralized testing, the failure rates range from 0.3-0.6%; however the potential for false failures remains high.

Keyless ignition systems have become more widespread than they were when the Oregon program information was developed and the Massachusetts pilot program was conducted. Keyless ignition systems operate in a variety of ways: some vehicles automatically start when the electronic key approaches the vehicle, while others activate the ignition and require the motorist

to merely push a button to start the vehicle. With more of these varied systems achieving market penetration, the likelihood that an inspector would miss a bulb that is only illuminated for a short time in a vehicle tested in KOEO mode would be expected to increase.

Another factor makes a KOEO bulb check difficult is the number of self-monitoring warning lights populating vehicle dashboards. In addition to the traditional temperature, oil pressure, and charging system indicator lights, many dashboards now include indicator lights for antilock brake systems, air bag monitors, electronic stability control, active suspension, driving mode selection, light monitors (for burned out bulbs), low fuel indicators, loose gas caps, and unclosed doors. Add other functions, such as hybrid vehicle power distribution and diesel catalytic systems for certain other vehicles, and it is understandable that an inspector might have difficulty locating the MIL among all the other bulb tests the vehicle performs when the ignition key is turned on.

MassDEP estimates that the average Massachusetts inspector would see about 2-4 vehicles/year that fail the KOEO bulb check. Assuming the Oregon finding that half of the KOEO bulb check failures also failed because the MIL was commanded on, that leaves 1-2 failures related directly to these bulbs per year (assuming the KOEO bulb check failure rate information from other state includes no false failures).

In summary, Massachusetts is not proposing to perform a KOEO bulb check for all vehicles as part of the OBD test procedure because:

- The KOEO bulb check failure rate is low in other states;
- Vehicles with disabled MILs are likely to be vehicles that fail the electronic scan of the OBD system;
- Vehicles failing the electronic scan of the OBD system because the MIL is commanded on will receive a bulb check;
- The bulb check is becoming increasingly prone to false failures because of changes in vehicles themselves; and
- False failures related to the bulb check raise concerns about costs to motorists in terms of both time and money.

Discretionary Flexibility for Operational Issues

The amendments would provide the Agencies with some flexibility to address unusual or unanticipated problems that can affect the operation of I&M program. For example, the elimination of the two-year deferral of emissions testing for new vehicles may mean that new or substantially redesigned vehicle models may experience design or production problems would cause them to fail their initial emissions test if MassDEP does not establish limited alternative emissions test procedures or defer the requirement until manufacturers can take corrective action. As medium- and heavy-duty vehicle classes are outfitted with OBD systems, vehicle or engine manufacturers may experience implementation issues that require states to be flexible.

In another example, hand controls that allow a handicapped person to operate a vehicle may be installed so that they block the OBD port, preventing an OBD inspection from being performed.

This type of problem may require that a customized test be developed specifically for an individual vehicle, as opposed to a class of vehicles.

MassDEP intends to use the flexibility provisions only to address operational problems, to advise EPA in a timely manner when these problems arise, and to make appropriate adjustments in response to EPA concerns.

Opacity Emissions Test Cutpoints for Diesel Vehicles Weighing More Than 10,000 pounds

EPA established the first emissions standards for smoke, hydrocarbons, oxides of nitrogen and carbon monoxide for new diesel engines in 1974. Emissions standards for particulate matter were added for new diesel engines beginning in 1988. Over time, deterioration and poor maintenance of diesel engines can cause excessive levels of pollution that is seen as black smoke. Inspections that use opacity tests to measure the density of black smoke identify vehicles that need to be repaired. Although the smoke opacity test does not test the diesel vehicles at their respective engine emissions standards (as with the OBD test), it can identify vehicles that exceed certain opacity levels (or "cutpoints"): the percent opacity (proportion of black smoke in the vehicle's exhaust) is used as an indicator of the level of particulate matter that the vehicle is emitting.

Smoke inspections on older trucks and buses have spurred their owners to conduct preventative maintenance. The opacity inspection protocol used in most northeast states (including Massachusetts) is the SAE J1667 Snap-Acceleration Smoke Test Procedure for Heavy-Duty Diesel Powered Vehicles[9]. In 1999, EPA issued "Guidance to States on Smoke Opacity Cutpoints to be used with the SAE J1667 In-Use Smoke Test Procedure"[10] supporting the cutpoints that the program currently uses to identify vehicles needing repairs. Also in 1999, Massachusetts joined eight other northeastern states in signing a Memorandum of Understanding to develop smoke opacity inspection programs that are as consistent as possible. Massachusetts began conducting opacity inspections in 2000 on diesel vehicles model year 1984 and newer. Under the proposed amendments, diesel vehicles more than 10,000 pounds GVWR that are not OBD-equipped would continue to receive the opacity test in Massachusetts.

Recent developments in the diesel engine industry and improvements in the emissions control technologies for diesel engines combine to make diesel exhaust much cleaner than it has been in the past. EPA's requirement that all on-road diesel vehicles use ultra low sulfur diesel fuel[11] (that took effect on October 15, 2006), has allowed for more stringent engine emission standards beginning with model year 2007. As a result, new diesel vehicles are being equipped with diesel particulate filters to lower emissions.

As a result of these developments, New Jersey is now considering lowering its diesel opacity cutpoints for heavy duty trucks and buses, which would be used in both roadside inspections and

[9] *The Snap-Acceleration Smoke Test Procedure for Heavy-Duty Diesel Powered Vehicles*, 1996-02, issued by the Society of Automotive Engineers (SAE).
[10] Guidance to States on Smoke Opacity Cutpoints to be used with the SAE J1667 In-Use Smoke Test Procedure, February 25, 1999. http://www.epa.gov/oms/regs/hd-hwy/smokguid.pdf
[11] Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements, 40 CFR 69, 80 and 86, Federal Register January 18, 2001

their IM program, based on their study of 70,000 New Jersey smoke opacity inspections[12]. MassDEP is proposing in this regulation package to adopt these lower diesel opacity cutpoints, which are also being considered for adoption by other northeast states.

Emissions Waivers

EPA allows states to offer waivers from compliance with emission standards, in order to balance repair costs for failing vehicles with the environmental benefits that result from successful repairs and provide some economic relief to owners of failed vehicles. In Massachusetts, waivers have been made available to motorists whose vehicles have failed their re-inspections after having met certain repair criteria, which include a requirement that emissions-related repairs are performed by a registered repair technician. Emissions waivers are valid until the vehicle's next emissions inspection.

In 2005 and 2006, approximately 2.9 million initial OBD emissions tests were administered and approximately 9.2% (272,000) vehicles failed. The Agencies issued 210 waivers to OBD vehicles that failed their initial inspection in 2005 and 2006 (less than 0.1% of vehicles failing an initial OBD test). MassDEP attributes the low emissions waiver rate to:

- Motorists wanting their vehicle repaired properly;
- The program requiring emissions repairs be performed by registered repairers to qualify for waivers;
- The program providing assistance to motorists seeking emissions repairs and repairers performing the work; and
- The program prohibiting waivers for vehicles with misfire and catalytic converter problems.

Both the number of vehicles tested and the number of emissions failures are expected to increase as annual testing replaces biennial testing. However, both are expected to increase at the same rate, so that the failure rate is expected to remain roughly constant. With the changes proposed in this package to the criteria for obtaining a waiver, MassDEP does not anticipate a significant change in the rate at which waivers are issued: it is expected to remain at or below 1% of vehicles failing the OBD emissions test. As required by EPA, the emissions benefit of the proposed I&M program has been modeled with this emissions waiver rate.

The current waiver repair criteria and expenditure requirements took effect with the start of the current I&M program in 1999. The expenditure requirements use three tiers, to allow older vehicles to meet waiver eligibility requirements at lower costs than newer vehicles (see Table 3 below). While the current expenditure limits were lower than those required by EPA ($450 in 1989 dollars, adjusted based on changes in the Consumer Price Index or "CPI"), they were approved by EPA because MassDEP also prohibited issuing waivers to vehicles with after-repair emissions that are more than three times the pass/fail cutpoint and to OBD vehicles with engine misfire or catalytic converter problems identified by the OBD system. These additional criteria made the Massachusetts waiver requirement at least as restrictive as the higher waiver expenditure limit required by EPA.

[12] Northeast States Heavy-Duty Diesel Engine Repair Study, NESCAUM Heavy-Duty Diesel Workgroup, Repair Study Sub-Group, December 2006 – DRAFT

The amendments propose to increase the waiver expenditure threshold initially to the updated level established by EPA for vehicles five years old and newer, and would decrease the threshold by $100 or $200 for older vehicles. By retaining the three tiers, the program would continue to require lower expenditures for older vehicles. Table 3 compares the proposed initial repair expenditure requirements with the levels used in the current program. The $750 in Table 3 reflects the EPA-mandated $450 adjusted for CPI through 2007.

Table 3
Waiver Expenditure Requirements

Vehicle Age	Current Waiver Expenditure Requirement	Proposed Initial Waiver Expenditure Requirement
Five model years old or newer	$400	$750
More than five but less than 10 model years old	$300	$650
More than 10 model years old.	$200	$550

In addition to increasing the base expenditure thresholds, the amendments also propose to adjust the thresholds annually, by the percentage (if any) that the CPI for the preceding calendar year differs from the CPI for 1989 (the year on which EPA based the original thresholds). Adjusted expenditure limits would be rounded to the nearest five dollars. The limits for vehicles between five and ten years old, and for vehicles more than ten years old, would be adjusted by subtracting $100 and $200 respectively from the adjusted limit for vehicles five years old and newer. MassDEP would publish adjusted expenditure limits on the program's web site for the Enhanced Emissions and Safety Test Program, as well as informing motorists through inspection stations and registered repair shops. The first adjustments would take effect on January 1, 2010.

Although the repair expenditure requirements for older cars will still be $100-$200 less than EPA requirements, MassDEP is proposing to retain the program's current practice of not issuing waivers for vehicles with engine misfire or catalytic converter problems. In addition, waivers would also not be available for hybrid vehicles with problems with their energy storage devices, or for problems involving particulate filters on diesel vehicles. Under the amendments, waivers would only be available for vehicles registered for personal use (i.e., not for commercial vehicles), which would ensure that waivers would not be issued for more than 1% of the vehicles that fail an initial inspections, as required in the I&M SIP.

MassDEP is seeking comment on the proposed repair expenditure amounts for the emissions waiver and the revised criteria for waivers for OBD vehicles.

<u>Economic Hardship Failure Repair Extensions</u>

In some situations, a single major vehicle component must be repaired or replaced to enable a vehicle that has failed its initial inspection to resolve diagnostic trouble codes and pass its re-test;

these can include rebuilds or replacements of transmissions and engines. These repairs usually require significant expenditures, and can create an economic hardship for some vehicle owners. Therefore, the amendments propose to establish a one-time extension of the deadline for fixing emissions problems in certain situations. To qualify for this extension, the repair or replacement cost would need to be estimated by a registered repair technician to be more than 1.5 times the applicable waiver repair expenditure limit for a vehicle of that age. To obtain the extension, the motorist would need to bring the vehicle to a location designated by the MassDEP or RMV for an assessment, and the Agency (or its designee) would need to agree with the findings of the registered repairer.

The extension would not be available for commercial vehicles, vehicles that show evidence of emissions control system tampering, or vehicles that fail the safety inspection. Also, it would not be available for inspection failures associated with initial registrations or transfers of ownership. The extension would not be renewable. It would be valid until the vehicle's next emissions inspection: at that time, the vehicle would be required to pass the emissions test. This provision is intended is to give motorists extra time to pay for expensive major repairs, such as rebuilding or replacing a transmission or engine.

MassDEP is seeking comment on the proposed economic hardship failure proposal in general, and specifically on the proposed threshold value of greater than 1.5 times waiver expenditure limit for the vehicle's age.

Registered Repair Technicians

Air quality improvements from inspection and maintenance programs ultimately are obtained from effective repairs. In addition, vehicle owners expect that repairs required to reduce emissions will be accurate and cost effective. Because an increasing number of model year 1996 and newer vehicles are expected to fail when the program implements annual emissions testing, the Agencies place considerable emphasis on promoting proper emissions repairs through a registered repairer network.

Registered repairers have been, and will continue to be, an important component of the I&M program. Their knowledge and training in the repair of emissions systems is expected to allow the program to meet the commitment that MassDEP is making to EPA in its I&M SIP, i.e., to maintain the proportion of waivers issued at or below 1% of failing vehicles. Since an increasing portion of the Massachusetts vehicle fleet is OBD compliant, and OBD compliant light- and medium-duty diesel vehicles will be required to pass an emissions test, the registered repairer program needs to be updated to better serve motorists.

To become a registered repair technician under the current program, applicants must complete required MassDEP-approved training and be either ASE L-1 certified for non-diesel vehicles or ASE L-2 certified for diesel vehicles. However, the L-2 certification applies only to heavy-duty diesel engines. Therefore, the proposed amendments would expand the registered repairer network to include technicians who specialize in light- and medium-duty diesel vehicles. The proposed amendments would also take advantage of equivalent engine- and manufacturer-specific certifications by allowing registered repairers to be certified specifically for repairing

only those types of engines or vehicles at the repair facility or dealership recognized by the engine or vehicle manufacturer at which the registered repairer is employed.

The amendments propose to allow MassDEP to remove repairers from the list of registered repair technicians if the repairer does not maintain the requirements for qualification, if he/she provides false documentation of the repair or the costs of the repair to the Agencies, or MassDEP determines that he/she has been a party to deceptive or fraudulent business practices related to emissions repairs or to environmental protection. In addition, MassDEP would expand its ability to remove repair shops from the list of registered repair facilities to include situations where the shop provides false documentation of repairs or their costs to the Agencies, and where the repair shop has been determined to have been a party to deceptive or fraudulent business practices related to emissions repairs or environmental protection. The list of registered repair facilities would continue to be maintained by MassDEP on the Enhanced Emissions and Safety Test Program's web site.

IV. AIR QUALITY IMPACTS

In order for the proposed I&M regulation to be approved by EPA as a revision to the Massachusetts ozone SIP, MassDEP must demonstrate how the program changes will reduce emissions from on-road mobile sources using EPA's approved model (MOBILE6). This model uses specific Massachusetts' data (such as fleet age by vehicle class, vehicle miles traveled, and ambient temperatures) in combination with national factors established by EPA (such as emission factors for vehicles by age and class). The model also uses parameters that describe the emissions benefits of all of the Commonwealth's mobile source emission control programs (such as Stage II Vapor Recovery and Reformulated Gasoline). The model calculates on-road emissions from the Massachusetts vehicle fleet (in grams per mile) that are expected to remain after all of the mobile source emission control programs are taken into account. When these emission estimates are combined with estimates of vehicle miles traveled by the fleet, the overall inventory of on-road vehicle emissions can be expressed in terms of tons per summer day (tpsd).

Section 110(n) of the U.S. Clean Air Act[13] (the "savings clause") states that if a program required by the Act is revised, it must maintain at least the emission benefits demonstrated when it was first approved into the SIP. Since EPA requires Massachusetts to implement an I&M program due to the Commonwealth's non-attainment status with respect to ground level ozone, the revised program that these regulation amendments would establish must maintain at least the level of emission reductions that were demonstrated for the current I&M program.

MassDEP has modeled the emissions impact of the proposed program, which relies on annual OBD testing and removes requirements for transient testing for pre-model year 1996 vehicles, using EPA's MOBILE6 model. MassDEP assumed the proposed program would begin in October 2008 and would exempt vehicles that are 15 or more model years old from the emissions testing requirement. The emissions benefits of the proposed program were compared with those estimated for the current program with biennial emissions testing (transient testing for model year 1984-1995 vehicles and OBD testing for model year 1996 and later vehicles). The

[13] The Clean Air Act, (42 U.S.C. 7401097626). http://www.epa.gov/ttn/oarpg/gen/caa-pdf.pdf

estimated figures for vehicle miles traveled per day by the Massachusetts fleet as a whole that were used to determine the emissions figures are shown in Table 4.

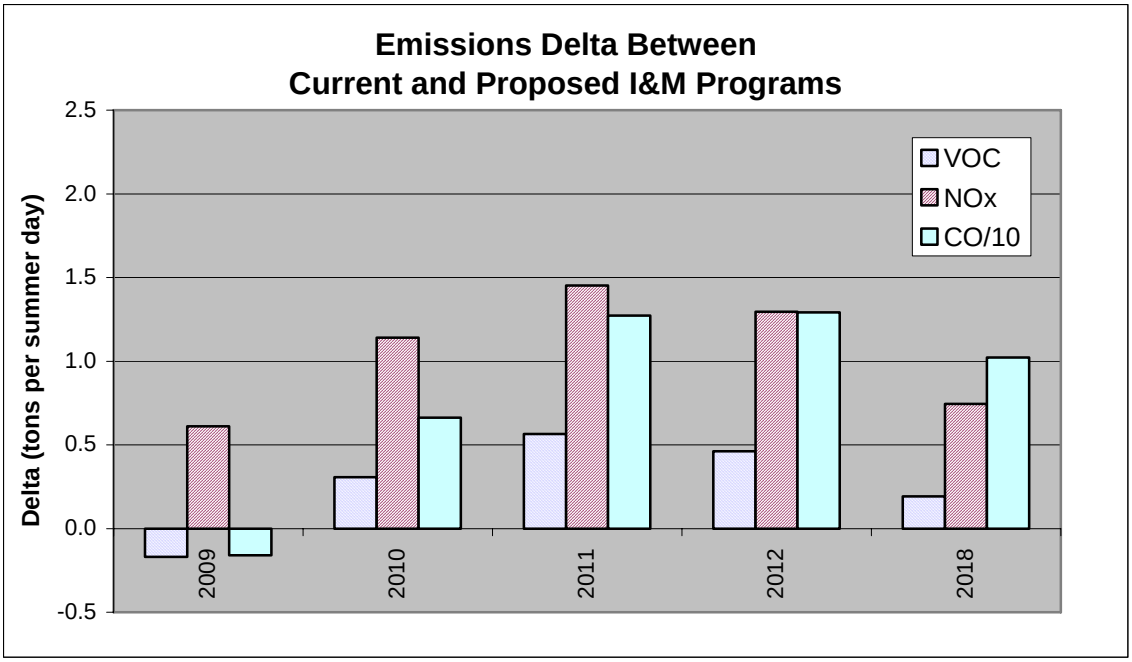
Table 4
Estimated Vehicle Miles Traveled Used to Model Air Quality Impacts of Proposed Changes in the Massachusetts I&M Program

	2009	2010	2011	2012	2018
Estimated VMT per day	149,228,000	149,962,000	150,694,000	151,427,000	155,700,000

Table 5 and the graph below show the results of the modeling for 2009 through 2012, and for 2018 (the final analysis year required by EPA for the 8-hour Ozone SIP). The emission figures show the tons per summer day of on-road mobile source emissions that would remain if the current biennial testing program were to be continued into the future, under the proposed annual OBD testing program, and the difference, or delta, between the two.

Table 5
Comparison of Emissions for Current and Proposed I&M Programs

	Pollutant	2009 (tpsd)	2010 (tpsd)	2011 (tpsd)	2012 (tpsd)	2018 (tpsd)
Current IM Program	VOC	73.61	67.18	61.60	56.32	38.97
	NOx	224.7	196.5	170.6	147.7	65.0
	CO	1002.1	938.6	885.2	837.8	711.5
Proposed IM Program	VOC	73.78	66.87	61.04	55.86	38.78
	NOx	224.0	195.4	169.2	146.4	64.2
	CO	1003.7	932.0	872.5	824.9	701.3
Delta = Current - Proposed IM Programs	VOC	-0.17	0.31	0.57	0.46	0.19
	NOx	0.6	1.1	1.5	1.3	0.7
	CO	-1.6	6.6	12.7	12.9	10.2



These figures show that an annual OBD program, without transient testing, will result in slightly more VOC emissions (0.17 tpsd) in 2009 than would be expected if the current program were to be continued. However, an expected decrease in NOx emissions (0.6 tpsd) leads to a net reduction in ozone forming pollutants. While the modeling also shows a slight increase in CO emissions (1.6 tpsd) in 2009, the pollutants that are most important for ozone production are NOx and VOCs.

For the following reasons, MassDEP believes the program envisioned for the new contract meets the requirements of the U.S. Clean Air Act's savings clause:

- These results assume no carryover of emission reduction benefits from the current transient testing program that will end on September 30, 2008. A carryover effect would recognize that emissions from most of the vehicles that currently receive a biennial transient test will not automatically rise to levels that would result in a failing test immediately at the end of the current program, and would allow these benefits to be estimated in the modeling as a benefit in the proposed I&M program. Because the MOBILE6 model does not recognize any carryover effect, it assumes the tailpipe testing benefit ends as soon as the program stops. MassDEP believes this is unrealistic. EPA Region 1 has agreed that residual credit from the tailpipe testing would make up for the small increase in HC and CO emissions that the model predicts in 2009.

- The MOBILE6 model calculates emissions on the basis of complete calendar years, and does not allow for testing to begin in October of a calendar year, when annual testing under the proposed program will begin. Therefore, the model does not account for emission benefits that would be earned between October 1, 2008 and December 31, 2008.

- Table 6 below shows that the estimated difference in emissions benefits between the current program and the proposed program are well within the model's margin of error.

In consideration of all of these factors, MassDEP believes the proposed program will achieve the reductions needed for the SIP. Specifically, in 2009, the 0.17 tpsd difference for VOCs represents less than 0.3% of VOC emissions modeled; and the 0.6 tpsd difference for NOx represents an improvement of almost 0.3% of NOx emissions modeled. For CO, the 1.6 tpsd difference represents less than 0.2% of CO emissions modeled. Table 6 shows that the proposed program will create very close to 100% of the air quality benefits of the current program for VOC and CO in 2009, and more than 100% for NOx.

Table 6
Detailed Comparison of Emissions for 2009

Emissions from Programs				Benefit from Programs		Differences between Programs		
2009	**No IM Program (tpsd)**	**Current Program (tpsd)**	**Proposed Program (tpsd)**	**Benefit of Current Program (tpsd)**	**Benefit of Proposed Program (tpsd)**	**Delta Between Benefits (tpsd)**	**Delta vs. Current Program**	**Proposed vs. Current Program**
VOC	84.57	73.61	73.78	10.96	10.79	-0.17	0.23%	98.4%
NOx	241.1	224.7	224.0	16.4	17.0	0.6	0.27%	103.7%
CO	1224.9	1002.1	1003.7	222.9	221.3	-1.6	0.16%	99.3%

Table 7 shows that the proposed program's slight increase in VOC emissions modeled for 2009 over those expected from continuing the current programs will disappear beginning in 2010, when the emissions benefits of the proposed annual OBD program are projected to go beyond those of the current program with biennial transient testing.

Table 7
Detailed Comparison of Emissions for 2010

Emissions from Programs				Benefit from Programs		Differences between Programs		
2010	**No IM Program (tpsd)**	**Current Program (tpsd)**	**Proposed Program (tpsd)**	**Benefit Current Program (tpsd)**	**Benefit Proposed Program (tpsd)**	**Delta Between Benefits (tpsd)**	**Delta vs. Current Program**	**Proposed vs. Current Program**
VOC	77.98	67.18	66.87	10.81	11.11	0.31	0.46%	102.8%
NOx	213.0	196.5	195.4	16.5	17.7	1.1	0.56%	106.9%
CO	1160.0	938.6	932.0	221.4	228.0	6.6	0.70%	103.0%

In addition, Table 5 and its associated graph show that the emissions of NOx and VOC under the proposed I&M program will continue to remain below the emissions of the current I&M program through 2018, helping Massachusetts to attain the ozone standard over time. While the difference between the two programs decreases somewhat after 2011, please note that

MOBILE6 does not allow for any credit from the OBD emissions testing of light-, medium-, and heavy-duty diesel vehicles that would begin on the schedule described in Table 1 above.

V. ECONOMIC IMPACTS

There are three main changes in the proposed regulation that are expected to have an economic impact on the Commonwealth: (1) the elimination of dynamometer tailpipe emissions tests; (2) the requirement for more stringent opacity cutpoints for diesel vehicles more than 10,000 pounds GVWR; and (3) the increase in emissions test frequency from biennial to annual testing.

Elimination of Dynamometer Tailpipe Testing

With the existing dynamometer workstation equipment reaching the end of its useful life, this proposed regulation allows for a much less expensive replacement with new OBD-only workstation equipment. New OBD-only workstations will not need emission gas analyzers, oxygen sensors and air filters. While the new stations will still need "consumable" items such as stickers, printer ink and paper, they will not require other (more expensive) consumable items such as gases needed to calibrate the emissions gas analyzers. In general, the new OBD-only workstation equipment will be simpler, with fewer moving parts. Therefore, it will also cost much less to maintain workstations and to replace them when needed. The total cost for a new OBD-only workstation, including installation and maintenance, is expected to be approximately $5,000 vs. approximately $80,000 for the old dynamometer workstation.

In addition, it will be much less labor intensive for the Agencies to audit the performance of the new OBD-only workstation equipment (to ensure that they are providing emission tests within acceptable ranges of tolerance). This will allow the Agencies to perform the QA/QC audits themselves, rather than hiring an outside technical support contractor to perform the audits (which could save the Commonwealth approximately $600,000 per year).

More Stringent Opacity Test Cutpoints

The NESCAUM Heavy-Duty Diesel Workgroup[14] analyzed the proposed lower cutpoints by reviewing heavy-duty diesel truck smoke inspection data from various states to compare current average smoke levels to the current and proposed cutpoints. These data suggest that most of the diesel engines in this study would meet the proposed cutpoints, but that tighter cutpoints would reduce excessive black smoke from enough additional vehicles to provide a benefit for Massachusetts' air quality.

A review of opacity tests performed in 2004 and 2005 on Massachusetts' diesel vehicles greater than 10,000 pounds GVWR was done by I&M program staff in conjunction with the NESCAUM study. This review showed that 1.6% of diesel vehicles in Massachusetts fail the opacity test at the current cutpoints, and indicated that an additional 3% of diesel vehicles (approximately 2000 additional vehicles) in Massachusetts could be affected by the proposed cutpoints in the first

[14] Northeast States Heavy-Duty Diesel Engine Repair Study, NESCAUM Heavy-Duty Diesel Workgroup, Repair Study Sub-Group, December 2006 – DRAFT

year. These vehicles would need to receive some level of repair to pass the smoke opacity inspection. Not all of these vehicles would necessarily fail, however, because many fleets repair and test their own vehicles and would be likely to perform needed repairs before the vehicles were tested. Most of these affected vehicles (~60%) are expected to be older (model years 1984 to 1990) trucks.

Available smoke opacity repair data were also analyzed by the NESCAUM Heavy-Duty Diesel Workgroup[15]. These data suggest that most of the repairs required to bring trucks that fail based on the current cutpoints back into compliance cost less than $1,000 on average, with average repair costs for older trucks (1984 - 1990) less than $500. Older trucks are expected to be the most affected by the adoption of the proposed cutpoints, and they are often the least expensive to repair. Diesel vehicles greater than 10,000 pounds GVWR would continue to be ineligible for an emissions waiver under the proposed I&M regulation, since waivers would not be provided to commercial vehicles (virtually all of the vehicles in this class are commercial vehicles).

The proposed cutpoints have not been implemented in any state yet (although they are expected to be proposed by the New Jersey Department of Environmental Protection before the end of 2007), so there are no data available to evaluate actual increases in repair costs that would be associated with them. However, since most of the trucks repaired under the current cutpoints would easily pass the opacity test under the proposed cutpoints (with no additional repairs required), this impact is expected to be minimal.

Mass DEP seeks comment on the proposed cutpoints, estimated cost of repairs and worthiness of making this change in the diesel testing program.

Increase in Emissions Test Frequency

Changing from biennial to annual emissions testing is anticipated to result in an increase in the annual number of vehicles that fail their emissions test, with a corresponding increase in motorist expenditures for repair costs.

Vehicles that fail the OBD test will be required to be repaired whenever they fail, which may be annually, instead of biennially. This will put upward pressure on total repair costs. However, for some motorists, by requiring repairs earlier than would have been required with biennial testing, the overall cost of repairs may be reduced because defects can be repaired before significant deterioration or damage to other components could occur. Additionally, OBD systems are designed to provide qualified repair technicians with diagnostic information allowing them to pinpoint likely causes, allowing more accurate diagnosis and less costly repairs than hit-or-miss component replacement.

Motorists who cannot repair their vehicles and pass a re-test have been able to qualify for a repair cost waiver when repairs exceed $200-$400, depending on the age of the vehicle. In 2006, only 165 waivers were granted, less than 0.01% of the emissions test administered that year. Under the proposed regulations, motorists would be required to spend $550-$750 to qualify for a

[15] Northeast States Heavy-Duty Diesel Engine Repair Study, NESCAUM Heavy-Duty Diesel Workgroup, Repair Study Sub-Group, December 2006 – DRAFT

waiver. In EPA's 2005 analysis of OBD vehicles[16], the average repair cost was found to be $453, with a median repair cost of $258 – expenditures that are well below the proposed expenditure requirement for a waiver. Therefore, the move to annual testing is not expected to result in a substantial overall increase in motorists' costs.

Even though repair costs are not estimated to be high in general, some vehicles may require high-cost repairs to fix transmission failures or serious engine damage. Under the proposed regulation, owners of these vehicles would be able to use a one-year extension to schedule the needed repairs as their finances allow, or to replace the vehicle if they feel it is not worthwhile to repair it.

Diesel vehicles greater than 10,000 pounds GVWR would have an annual smoke opacity test under the proposed regulation, rather than the biennial test that is currently administered, unless they have OBD systems that would allow OBD testing, which is not currently required. The start of emissions testing of these vehicles will likely require a small number of owners of vehicles that are not currently getting emissions tests to repair them in order to pass. Diesel vehicles are a small fraction of vehicles subject to the emissions test, and the number of diesel vehicles expected to fail the OBD test is low. Also, until the model year 2007, emissions control systems for diesel vehicles consisted mostly of minor engine adjustments and the use of exhaust gas recirculation to meet engine EPA's emissions standards, so the cost of repairs for failing vehicles is expected to be reasonable. As a result, OBD testing of diesel vehicles is not expected to have a substantial impact on overall motorist repair costs.

The proposed regulation would exempt light- and medium-duty vehicles from emissions testing when they are 15 years old. In 2006, the percentage of the fleet over 15 years old was less than 10%, representing a small segment of total light- and medium duty vehicles. Because older vehicles are driven fewer miles, they also represent a small fraction of total miles traveled. Exempting these older vehicles is expected to put a downward pressure on total repair costs.

For newer OBD vehicles, eliminating the new vehicle exemption will provide an added degree of consumer protection for motorists by enabling them to get a new car fixed while it still under warranty.

[16] "High-mileage Study of On-Board Diagnostic Emissions," by EPA, published in Air and Waste Management in 2005